

Appl. No. 09/682,043  
 Amdt. Dated Oct. 07/2004  
 Reply to Office action of July 09, 2004

### REMARKS/ARGUMENTS

In the specification, the paragraphs [0017] and [0018] have been amended to correct minor editorial problems. The new paragraph [0008.1] and the amended paragraph [0047] introduce the preferred embodiment anticipated in paragraphs [0020],[0047] and illustrated in FIG.1. In the amended paragraphs [0044] and [0046] the omitted word *accumulated* (anticipated in the paragraph [0018]) has been added. The paragraphs from [0049] to [0067] (consisting of a list of references) have been removed and submitted in a separate paper.

Claim 1 has been withdrawn due to the rejection by the examiner due to the lack of antecedent basis for a series of limitations and the declaration of a non-statutory subject matter.

Claim 2 has been added to limit the disclosure to a practical application within the technological arts (the integrated circuit placement problem) anticipated in paragraphs [0020] and [0047].

Claim 3 has been added. Antecedent basis of the limitations in this claim are provided in the Detailed Description of the Invention.

The amendments above are directed to save the examiner's claim rejection under 35USC\$112 and 35USC\$101.

With respect to the examiner's claim rejection under 35USC\$102 the applicant considers that the method disclosed was not anticipated by Masui:

-The examiner remarks: "According to Masui, the process of combinatorial optimization requires steps of scheduling simulated annealing (col. 6, lines 46-66, col. 7, line 26 to col. 8, line 59) with initial temperature, and dynamically adjusting the annealing process to optimize convergence schedule accordingly to probabilities of acceptance due to entropy variation (col 11, lines 22-39, col.13-21)".

- According to the expressed in the Background of the Invention and according to the technological art, Simulated Annealing is a method to solve combinatorial optimization problems. To solve such problems with Simulated Annealing, a large number of Simulated Annealing Schedules have been proposed. The Simulated Annealing Schedules used by Masui (Geman and Geman, Fast Annealing, etc.) are well known and referred in our Background of the Invention. In addition, according to Column 8, line 56-58 of the Masui's document "the Temperature parameter T(t) is basically lowered in association with an increase in the iteration count". The Simulated Annealing schedule we propose does not depends on the iteration count and is different to all Simulated Annealing Schedules previously proposed.

On the other hand, the references of Masui to Entropy have not relationship with our disclosure since Masui add an entropy term to the objective function ("adding to the objective function the entropy term" Claims 7, 8, 9, 20) but not using it in the Simulated Annealing Schedule.

Respectfully submitted,

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## References

### U.S. PATENT DOCUMENTS

5,745,735 4/1998 Cohn, et al.

6,088,519 5/1998 Koford

5,875,117 4/1996 Edwin

5,568,381 10/1996 Hara, et al.

6,185,724 12/1997 Ochotta

4,495,559 1/1985 Gelatt

### OTHER REFERENCES

S. Kirkpatrick, C.D. Gelatt, and M.P. Vecchi, "Optimization by simulated annealing," Science, vol. 220, no. 4598, pp. 671-680, May 1983.

D.F. Wong, H.W. Leong, C.L. Liu, "Simulated Annealing for VLSI Design", Kluwer Academic Publishers, 1988.

R.H.J. M. Otten, L.P.P.P. van Ginneken, "The Annealing Algorithm", Kluwer, 1989.

B. Hajec, "Cooling schedules for optimal annealing", Mathematics of Operations Research 13, 1988, pp. 311-329.

E. Aarts, J. Korst, "Simulated Annealing and Boltzmann Machines, A Stochastic Approach to Combinatorial Optimization and Neural Computing", John Wiley & Sons, 1989.

S. Geman and D. Geman, "Stochastic relaxation, Gibbs distribution and the Bayesian restoration in images", IEEE Trans. Patt. Anal. Mac. Int. 6 (6), 721-741, 1984.

H. Szu, R. Hartley, "Fast simulated annealing", Physics Letters A 122, 1987, pp.157-162.

M. E. Johnson I. O. Bohachevsky, M. L. Stein, "Generalized simulated annealing for function optimization", Technometrics, 28(3), 1986. L. Ingber, "Adaptive simulated annealing (ASA): Lesson learned," Control and Cybernetics, 25, pp.33-54 (1996).

C. E. Shannon, "A mathematical theory of communication", I & II. Bell Syst. Tech. J., 27, pp. 379-423, 623-656, 1948.

V. Betz and J. Rose, "VPR: A new Packing, Placement and Routing Tools for FPC A Research", International Workshop on Field Programmable Logic and Application; 1997.

C. Sechen, and A. Sangiovanni-Vincentelli, "The TimberWolf placement and routing package," in Proc. Custom Integrated Circuit Conf. (Rochester, NY), 1984, pp. 522-527.